Empowered by Innovation

NEC Express5800/R120d-2E Configuration Guide

Storage-Rich model

Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC EXPRESS5800 server.

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NEC Corporation

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Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2400 product family
- Up to 384 GB of memory capacity, supporting high speed and energy efficient DDR3-1600 memory
- Up to 26 x 2.5-inch hard drives or twelve 3.5-inch hard drives plus two 2.5-inch hard drives
- High energy efficiency with power capping feature and 80 PLUS® Platinum power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

Specification

2.5-inch Drive Model

Model		R120d-2E	
Part Number		N8100-1952F	
Processor	**Type**	Intel® Xeon® processor E5-2403	Intel® Xeon® processor E5-2430
	Clock speed	1.8 GHz	2.20 GHz
	Number of Processors	1 to 2	
	Cache	10 MB	15 MB
	Cores and Threads	4C-4T	6C-12T
Chipset		Intel® C602 Chipset	
Memory	**Type**	DDR3-1333 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1066 ECC Registered Low Power DIMM	
	Standard Capacity	0 GB	
	Maximum Capacity	384 GB (12 x 32 GB)	
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing	
Internal Storage	**Standard Capacity**	0 GB	
	Maximum Capacity	SAS HDD : 23.4 TB (26 x 900 GB) SATA HDD : 26 TB (26 x 1 TB) SAS SSD : 10.4 TB (26 x 400 GB) SATA SSD : 2.6 TB (26 x 100 GB)	
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)	
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)	
	Hot Plug	Supported	
	Optical Disk Drive	Optional	
	Optical Drive Bays [free]	0 [0]	
	3.5-inch Media Bays [free]	0 [0]	
	Disk Drive Bays [free]	26 [26] [1]	
Expansion Slots [free]	**Standard**	Total: 6 slots available 1[1] x PCIe 3.0 x8 (x8 connector) 2[2] x PCIe 3.0 x4 (x8 connector) 1[1] x PCIe 2.0 x4 (x8 connector) 1[1] x PCIe 2.0 x1 (x4 connector) 1[1] x PCIe 3.0 x8 (x8 connector) dedicated RAID slot	
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)	
	Resolution / Color	1280 x 1024 / 16.7M [2]	

Model		**R120d-2E**	
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)	
Server Management		EXPRESSSCOPE Engine 3	
Redundant Fan		Optional, hot plug	
Redundant Power Supply		Optional, hot plug	
Power Supply		1 to 2 x 800 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	
Power Consumption	**Max. Config, Idling**	355 VA / 350 Watt	363 VA / 357 Watt
	Max. Config, Operating	476 VA / 462 Watt	581 VA / 565 Watt
Acoustical Noise (Sound Pressure Level) [3]	**Max. Config, Idling**	54.9dB	
	Max. Config, Operating	56.1 dB	
Dimensions (W x D x H)		448.4 x 696.3 x 87.4 mm / 17.6 x 27.4 x 3.4 in (2U)	
Weight (Minimum / Maximum)		17 kg / 31 kg, 37.48 lbs. / 68.34 lbs.	
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C [4] / 50° to 104° F [4], 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%	
Regulatory and Safety		FCC, C-TICK, CE, UL, CB, KC, RoHS, WEEE	
Operating Systems		Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Red Hat Enterprise Linux 5.7 or later (x86) [5] Red Hat Enterprise Linux 5.7 or later (EM64T) [5] Red Hat Enterprise Linux 6.1 or later (x86) [5] Red Hat Enterprise Linux 6.1 or later (x86_64) [5] VMware ESX 4.1Update 2 VMware ESXi 5.0 Update 1	

1 An optional drive cage is required to install more than 24 hard drives.

2 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

3 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

4 Operable up to 35°C (95°F) when 3 or more BBUs are installed.

5 For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

3.5-inch Drive Model

Model		R120d-2E	
Part Number		N8100-1953F	
Processor	**Type**	Intel® Xeon® processor E5-2403	Intel® Xeon® processor E5-2430
	Clock speed	1.8 GHz	2.20 GHz
	Number of Processors	1 to 2	
	Cache	10 MB	15 MB
	Cores and Threads	4C-4T	6C-12T
Chipset		Intel® C602 Chipset	
Memory	**Type**	DDR3-1333 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1066 ECC Registered Low Power DIMM	
	Standard Capacity	0 GB	
	Maximum Capacity	384 GB (12 x 32 GB)	
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing	
Internal Storage	**Standard Capacity**	0 GB	
	Maximum Capacity	SATA HDD : 36 TB (12 x 3 TB) plus 2.5-inch SATA: 2 TB (2 x 1 TB) 2.5-inch SAS: 1.8 TB (2 x 900 GB) 2.5-inch SAS SSD: 800 GB (2 x 400 GB) 2.5-inch SATA SSD: 200 GB (2 x 100 GB)	
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)	
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)	
	Hot Plug	Supported	
	Optical Disk Drive	Optional	
	Optical Drive Bays [free]	0 [0]	
	3.5-inch Media Bays [free]	0 [0]	
	Disk Drive Bays [free]	14 [14] [1]	
Expansion Slots [free]	**Standard**	Total: 6 slots available 1[1] x PCIe 3.0 x8 (x8 connector) 2[2] x PCIe 3.0 x4 (x8 connector) 1[1] x PCIe 2.0 x4 (x8 connector) 1[1] x PCIe 2.0 x1 (x4 connector) 1[1] x PCIe 3.0 x8 (x8 connector) dedicated RAID slot	
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)	
	Resolution / Color	1280 x 1024 / 16.7M [2]	
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)	
Server Management		EXPRESSSCOPE Engine 3	
Redundant Fan		Optional, hot plug	
Redundant Power Supply		Optional, hot plug	
Power Supply		1 to 2 x 800 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	
Power Consumption	**Max. Config, Idling**	263 VA / 260 Watt	271 VA / 266 Watt
	Max. Config, Operating	362 VA / 360 Watt	466 VA / 463 Watt

Model		R120d-2E
Acoustical Noise (Sound Pressure Level) [3]	Max. Config, Idling	54.9dB
	Max. Config, Operating	56.1 dB
Dimensions (W x D x H)		448.4 x 696.3 x 87.4 mm / 17.6 x 27.4 x 3.4 in (2U)
Weight (Minimum / Maximum)		17 kg / 33 kg, 37.48 lbs. / 72.75 lbs.
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C [4] / 50° [4] to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%
Regulatory and Safety		FCC, C-TICK, CE, UL, CB, KC, RoHS, WEEE
Operating Systems		Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Red Hat Enterprise Linux 5.7 or later (x86) [5] Red Hat Enterprise Linux 5.7 or later (EM64T) [5] Red Hat Enterprise Linux 6.1 or later (x86) [5] Red Hat Enterprise Linux 6.1 or later (x86_64) [5] VMware ESX 4.1Update 2 VMware ESXi 5.0 Update 1

1 An optional drive cage is required to install more than 12 hard drives.

2 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

3 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

4 Operable up to 35°C (95°F) when 3 or more BBUs are installed.

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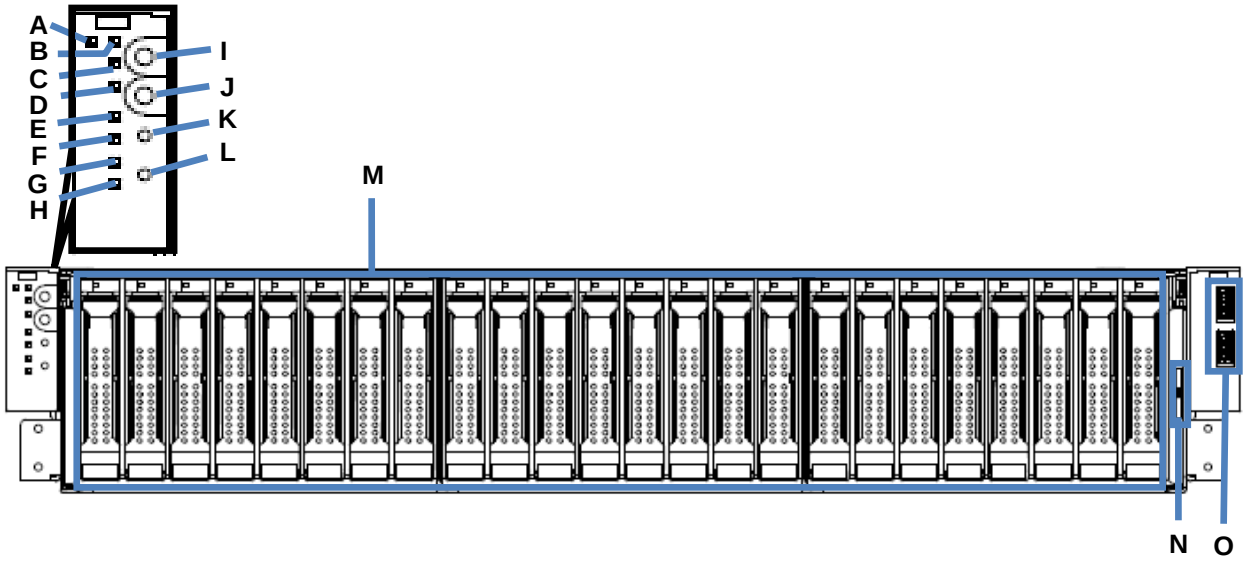
External Views

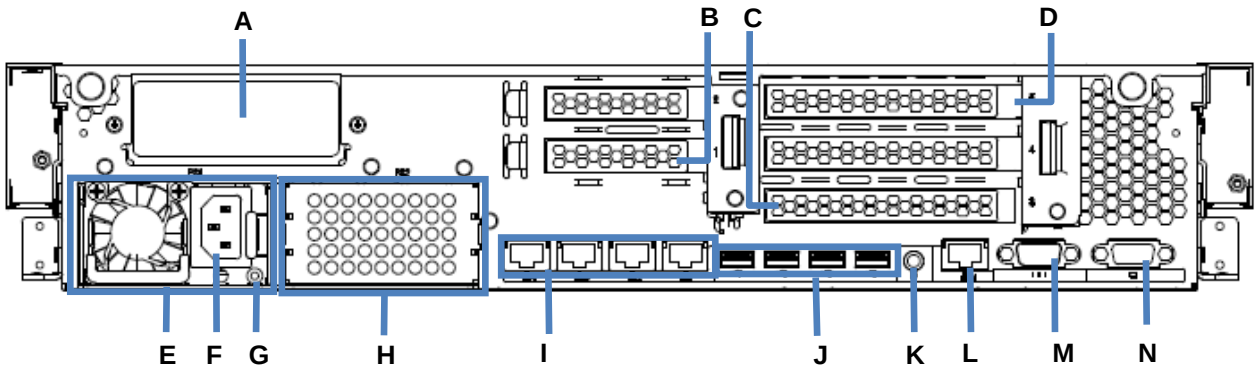
Front and Rear Views

Front View for 2.5-inch Drive Model



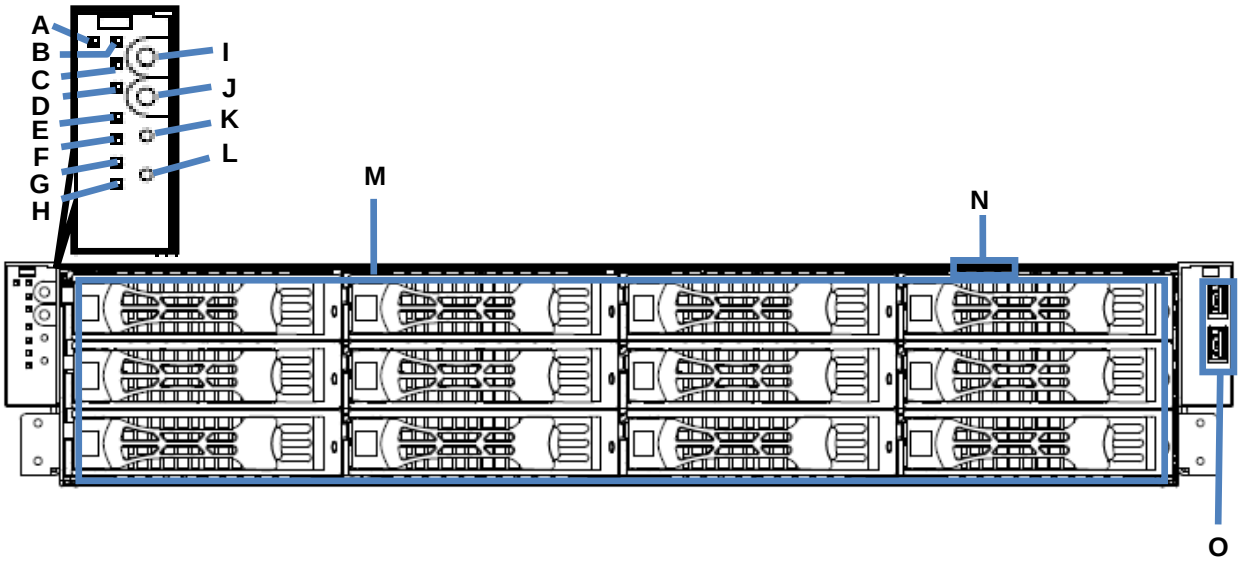
Legend			
A.	Power LED	**I.**	Power Button
B.	UID LED	**J.**	UID Button
C.	Hard Drive Activity LED	**K.**	BMC Reset Button
D.	System Status LED	**L.**	Dump (NMI) Button
E.	Data LAN 1 Activity LED	**M.**	2.5-inch Drive Bays
F.	Data LAN 2 Activity LED	**N.**	Pull-out Tab
G.	Data LAN 3 Activity LED	**O.**	USB Connectors
H.	Data LAN 4 Activity LED		

Rear View for 2.5-inch Drive Model



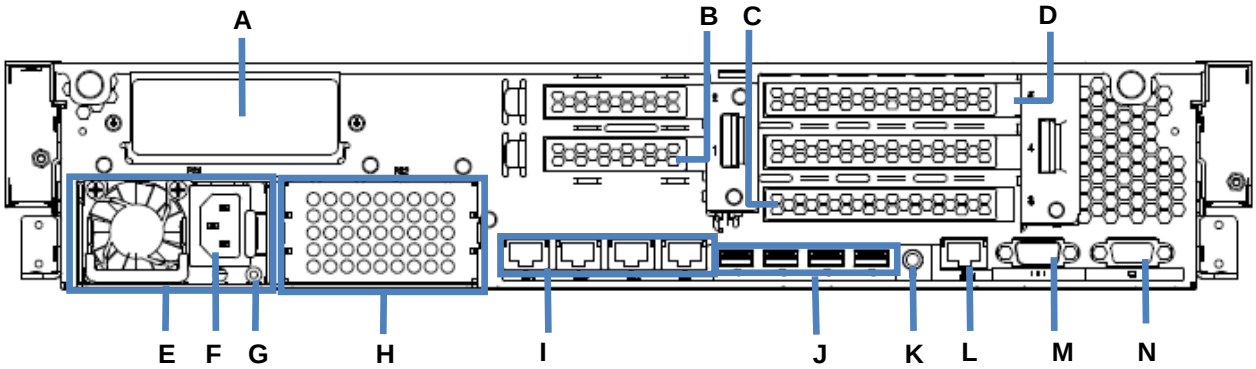
Legend			
A.	2.5-inch Drive Cage bay	**H**	Additional Power Supply Slot
B.	PCI Slots (Low-Profile)	**I.**	Data LAN Connectors
C.	PCI Slots (Low-Profile) (with Full Height bracket)	**J.**	USB Connectors
D.	PCI Slots (Full Height)	**K.**	UID Button/LED
E.	Power Supply	**L.**	Management LAN Connector
F.	AC Inlet	**M.**	Serial Port Connector
G.	AC Power LED	**N.**	VGA Connector

Front View for 3.5-inch Drive Model



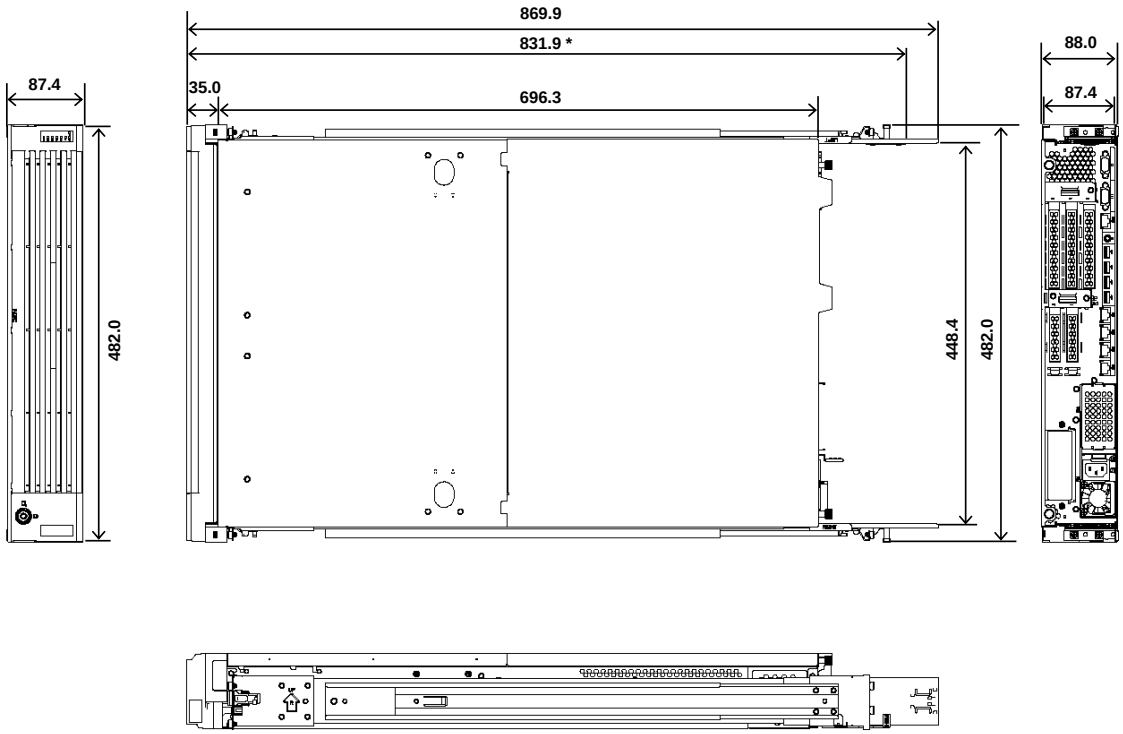
Legend			
A.	Power LED	**I.**	Power Button
B.	UID LED	**J.**	UID Button
C.	Hard Drive Activity LED	**K.**	BMC Reset Button
D.	System Status LED	**L.**	Dump (NMI) Button
E.	Data LAN 1 Activity LED	**M.**	3.5-inch Drive Bays
F.	Data LAN 2 Activity LED	**N.**	Pull-out Tab
G.	Data LAN 3 Activity LED	**O.**	USB Connectors
H.	Data LAN 4 Activity LED		

Rear View for 3.5-inch Drive Model



Legend			
A.	2.5-inch Drive Cage bay	**H.**	Additional Power Supply Slot
B.	PCI Slots (Low-Profile)	**I.**	Data LAN Connectors
C.	PCI Slots (Low-Profile) (with Full Height bracket)	**J.**	USB Connectors
D.	PCI Slots (Full Height)	**K.**	UID Button/LED
E.	Power Supply	**L.**	Management LAN Connector
F.	AC Inlet	**M.**	Serial Port Connector
G.	AC Power LED	**N.**	VGA Connector

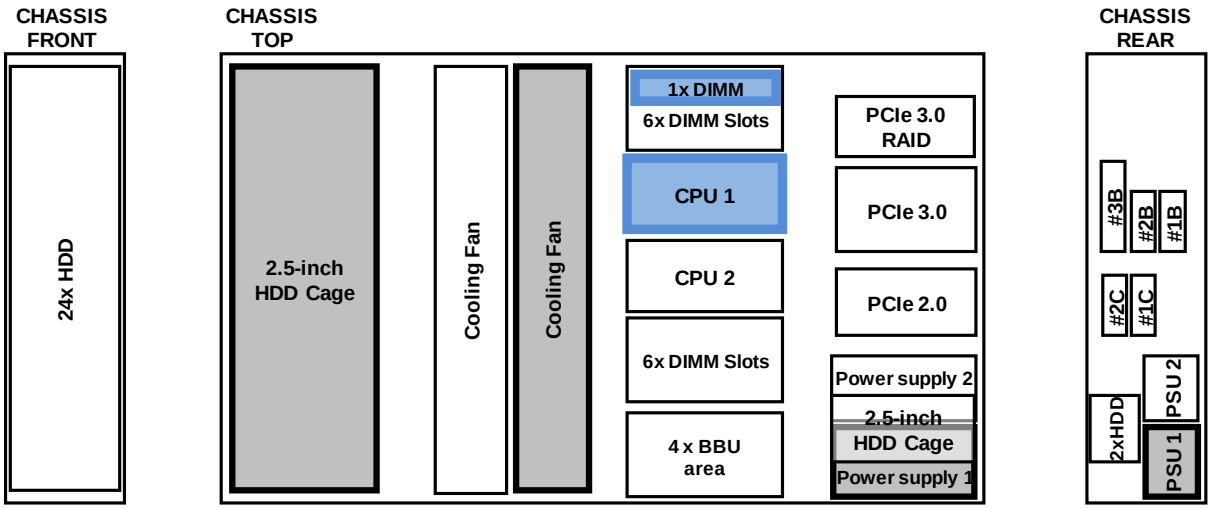
Dimensions (mm)



* Without back side parts of slide rail (cable arm cannot be attached)

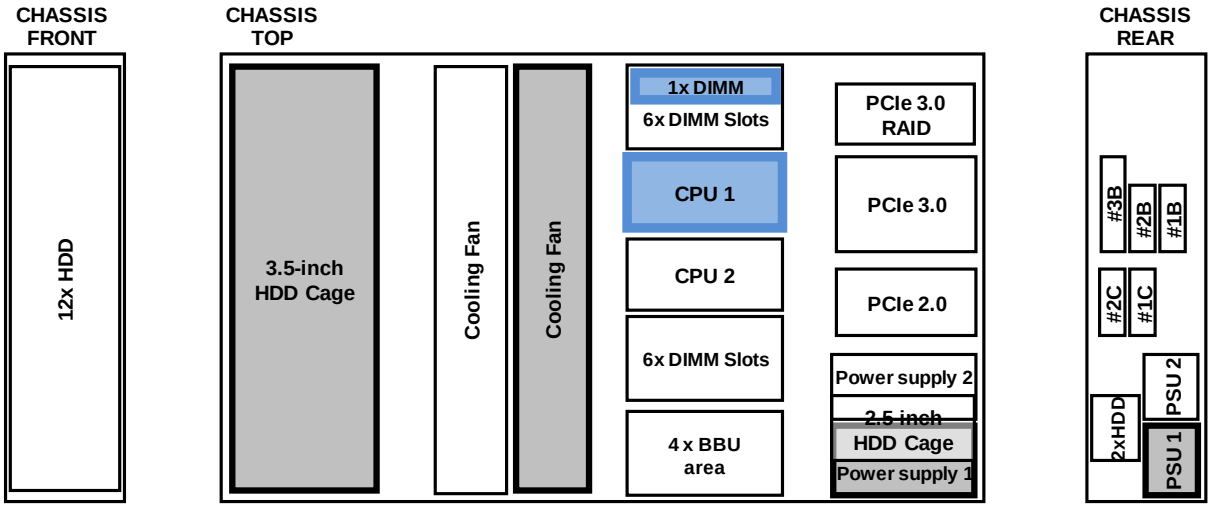
Configuration Diagram

2.5-inch Drive Model



Legend: Minimum required components Standard components

3.5-inch Drive Model



Legend: Minimum required components Standard components

Server Configuration

1 Base Models

2.5-inch Drive Model

Product Name / Description	Part Number
NEC Express5800/R120d-2E Server no processor, no RAM, no HDD Including: 24 x 2.5-inch drive cage, 800 Watt power supply, EXPRESSBUILDER DVD	N8100-1952F

NOTE:

- The base model must be ordered with a processor kit and a memory kit.

3.5-inch Drive Model

Product Name / Description	Part Number
NEC Express5800/R120d-2E Server no processor, no RAM, no HDD Including: 12 x 3.5-inch drive cage, 800 Watt power supply, EXPRESSBUILDER DVD	N8100-1953F

NOTE:

- The base model must be ordered with a processor kit and a memory kit.

2 Processors and Heat Sink

Available sockets: 2

Category		Product Name / Description	Part Number
Processors **1 Processor Required**		**Xeon E5-2403 Processor Kit** Intel® Xeon ® Processor E5-2403 (1.80 GHz, 4C/4T, 10 MB)	N8101-560F
		Xeon E5-2430 Processor Kit Intel® Xeon ® Processor E5-2430 (2.20 GHz, 6C/12T, 15 MB)	N8101-563F
Heat Sink	**1st**	**Processor Heat Sink** For 1st Processor	(Standard)
	2nd	**Processor Heat Sink** For 2nd Processor, including cooling fan kit	N8101-575F

NOTE:

- Minimum one processor kit from above must be installed.
- The processors must be the same to configure dual processor system.

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your memory configuration:

- Independent Channel: Refer to **3.1.1**
- Memory Sparing Configuration: Refer to **3.1.2**
- Memory Mirroring / Memory Lockstep Configuration: Refer to **3.1.3**

Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
Redundancy	No	Partly	No	Fully
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	3/4 physical memory	Full physical memory	Half physical memory
Available Memory Channels	3	3	2	2
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

3.1.1 Independent Channel Configuration

Available slots: 6 per processor

Category	Product Name / Description	Part Number
Unbuffered DIMM (UDIMM)	**4GB DDR3-1333 UNB Memory Kit** 1x 4GB Unbuffered ECC DIMM, DDR3L-1333(PC3L-10600) **NOTE:** - The x4 SDDC is not supported.	N8102-455F
Registered DIMM (RDIMM)	**2GB DDR3-1600 REG Memory Kit** 1x 2GB Registered ECC DIMM, DDR3L-1600(PC3L-12800) **NOTE:** - The x4 SDDC is not supported.	N8102-488F
	4GB DDR3-1600 REG Memory Kit 1x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-489F
	8GB DDR3-1600 REG Memory Kit 1x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-490F
	16GB DDR3-1600 REG Memory Kit 1x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-491F
	32GB DDR3-1066 REG Memory Kit 1x 32GB Registered ECC DIMM, DDR3L-1066(PC3L-8500)	N8102-492F

NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of three for triple-channel symmetric memory configurations to increase memory transfer speed.
- When two processors are installed, balance the DIMMs across the two processors.
- Mix configurations of UDIMM/RDIMM are not supported

3.1.2 Memory Sparing Configuration

Available slots: 6 per processor

Product Name / Description	Part Number
16GB DDR3-1600 REG Memory Kit 2x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-497
32GB DDR3-1600 REG Memory Kit 2x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-498

NOTE:

- Minimum one memory kit per processor must be installed.
- The configured memories must be identical.
- When two processors are installed, balance the DIMMs across the two processors.
- The logical memory capacity becomes three-fourths of physical capacity.

3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 4 per processor

Product Name / Description	Part Number
4GB DDR3-1600 REG Memory Kit 2x 2GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-493
8GB DDR3-1600 REG Memory Kit 2x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-494
16GB DDR3-1600 REG Memory Kit 2x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-495
32GB DDR3-1600 REG Memory Kit 2x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-496

NOTE:

- Minimum one memory kit per processor must be installed.
- The logical memory capacity becomes a half of physical capacity on memory mirroring configuration.

Maximum Memory Speed

See the table below for the actual maximum memory transfer speed in Independent Channel / Memory Sparing Configuration.

DDR3 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	Memory Power Setting	DIMM Speed
E5-2403	UDIMM: 4GB RDIMM: 2 GB, 4 GB, 8 GB,16 GB	-	1066 MHz
E5-2407	RDIMM: 32 GB	-	800 MHz
E5-2420	UDIMM: 4GB	-	1066 MHz
E5-2430	RDIMM: 2 GB, 4 GB, 8 GB,16 GB	-	1333 MHz
E5-2430L	RDIMM: 32 GB		800 MHz
E5-2450	UDIMM: 4GB		1333 MHz
E5-2470	RDIMM: 2 GB, 4 GB, 8 GB,16 GB	Low (1.35V)	1333 MHz
		Normal (1.5V)	1600 MHz
	RDIMM: 32 GB	-	800 MHz

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by OS		Maximum Available Memory
Microsoft Windows Server 2003 R2, Standard Edition Microsoft Windows Server 2008 Standard	**4 GB**	**4 GB (HW-DEP enabled)** **App. 2 GB (HW-DEP disabled)**
Microsoft Windows Server 2003 R2, Standard x64 Edition Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 R2 Standard (x64)	**32 GB**	**32 GB**
Microsoft Windows Server 2003 R2, Enterprise Edition Microsoft Windows Server 2008 Enterprise	**64 GB**	**64 GB**
Microsoft Windows Server 2003 R2, Enterprise x64 Edition	**1 TB**	**384 GB**
Microsoft Windows Server 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	**2 TB**	**384 GB**
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	**16 GB**	**16 GB**
Red Hat Enterprise Linux 5 (EM64T)	**1 TB**	**384 GB**
Red Hat Enterprise Linux 6 (x86_64)	**2 TB**	**384 GB**
VMware ESX 4.1[1]	**256 GB or 1 TB**	**256 GB or 384 GB**
VMware ESXi 5.0[2]	**2 TB**	**384 GB**

[1] Up to 255 GB of the main memory is available to each virtual machine
[2] Up to 1 TB of the main memory is available to each virtual machine.

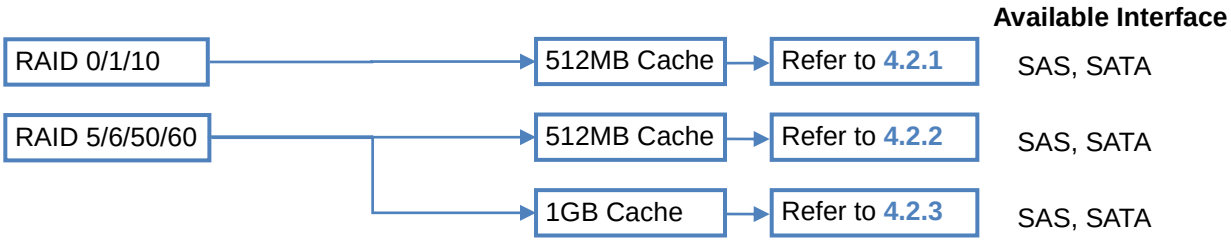
4 Internal Hard Disk Drives

4.1 RAID Configuration

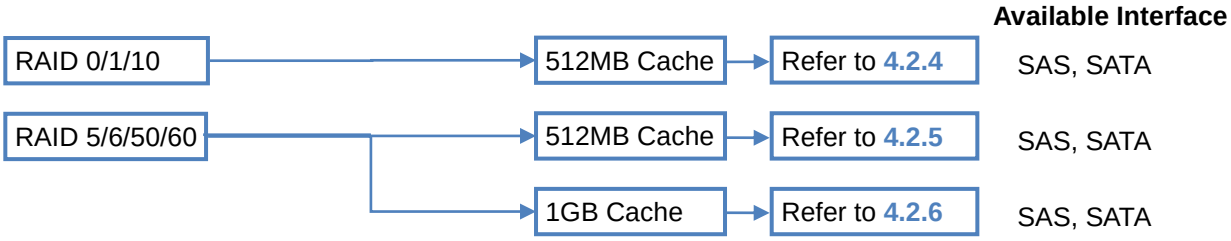
Refer to the section in accordance with your disk form factor and RAID configuration.

4.1.1 2.5-inch Drive Model

Up to 24 x 2.5-inch Drives



Up to 26 x 2.5-inch Drives

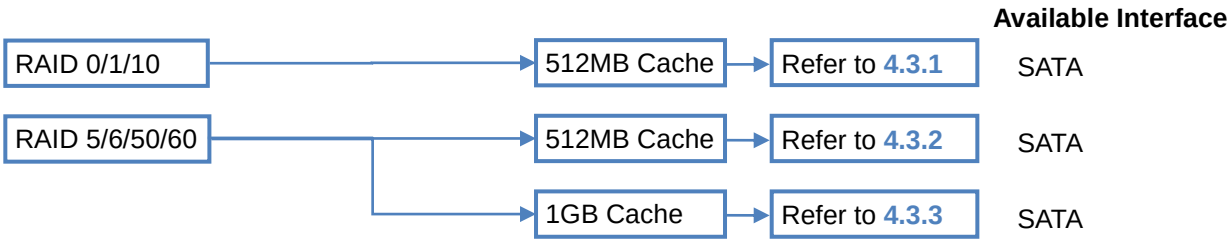


NOTE:

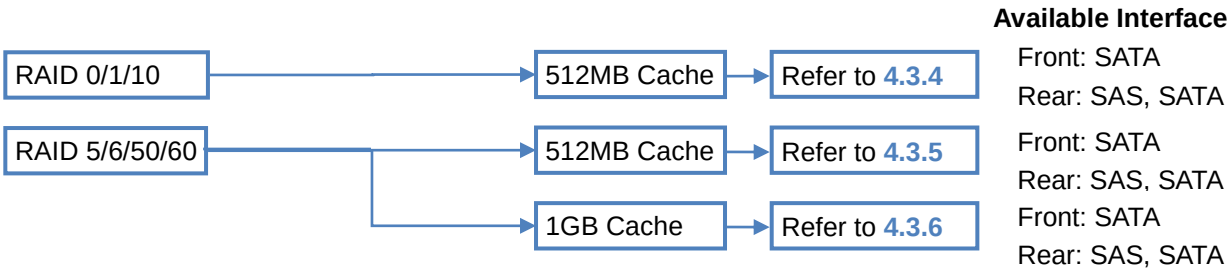
- Up to four hard drives can be installed in the Embedded SATA configuration.
- Hot plug insertion/removal are not supported in the Embedded SATA configuration.
- An optional RAID controller occupies one PCI slot.
- All hard drives within a RAID array should be of the same capacity and rotation speed. Also, hard drives in the back side (slot 24 to 25) must be in a separate RAID array than RAID arrays of hard drives in the front side (slot 0 to 23) for configuration 4.2.4 to 4.2.6.
- Dedicated Hot Spare / Global Hot Spare are supported by using RAID controller card (PCI Express). However, Global Hot Spare is not supported on the configuration 4.2.4 to 4.2.6. Also, hard drives in the back side cannot be used as Hot Spare drives of a RAID array of hard drives in the front side and front side drives cannot be used as Hot Spare drives of a RAID array of hard drives in the back side.
- Up to two kinds of drives can be mixed in a HDD cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.
- For optional RAID controller driver to install Windows Server 2003 R2, download from the NEC website at:
  http://www.nec.com/en/global/prod/express/download/index.html

4.1.2 3.5-inch Drive Model

Up to 12 x 3.5-inch Drives



Up to 12 x 3.5-inch Drives plus 2 x 2.5-inch Drives



NOTE:

- An optional RAID controller occupies one PCI slot.
- All hard drives within a RAID array should be of the same capacity and rotation speed. Also, hard drives in the back side (slot 12 to 13) must be in a separate RAID array than RAID arrays of hard drives in the front side (slot 0 to 11) for configuration 4.3.4 to 4.3.6.
- Dedicated Hot Spare / Global Hot Spare are supported by using RAID controller card (PCI Express). However, Global Hot Spare is not supported on the configuration 4.3.4 to 4.3.6. Also, hard drives in the back side cannot be used as Hot Spare drives of a RAID array of hard drives in the front side and front side drives cannot be used as Hot Spare drives of a RAID array of hard drives in the back side.
- Up to two kinds of drives can be mixed in a HDD cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.
- For optional RAID controller driver to install Windows Server 2003 R2, download from the NEC website at:
  http://www.nec.com/en/global/prod/express/download/index.html

4.2 Internal Drive Configuration for 2.5-inch Drive Model

4.2.1 Up to 24 x 2.5-inch Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/10, 512MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch HDD Cage** 24 x 2.5-inch hot plug drive bays	(Standard)
Drive 24 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.2.2 Up to 24 x 2.5-inch Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch HDD Cage** 24 x 2.5-inch hot plug drive bays	(Standard)
Drive 24 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.2.3 Up to 24 x 2.5-inch Drives with RAID 5/6 Controller with 1 GB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch HDD Cage** 24 x 2.5-inch hot plug drive bays	(Standard)
Drive 24 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.2.4 Up to 26 x 2.5-inch Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/10, 512MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch HDD Cage** 24 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch HDD Cage** 2 x 2.5-inch hot plug drive bays Including 2x Single SATA to 2x Single SATA cable	N8154-47
Drive 26 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.2.5 Up to 26 x 2.5-inch Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch HDD Cage** 24 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch HDD Cage** 2 x 2.5-inch hot plug drive bays Including 2x Single SATA to 2x Single SATA cable	N8154-47
Drive 26 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.2.6 Up to 26 x 2.5-inch Drives with RAID 5/6 Controller with 1 GB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch HDD Cage** 24 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch HDD Cage** 2 x 2.5-inch hot plug drive bays Including 2x Single SATA to 2x Single SATA cable	N8154-47
Drive 26 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.3 Internal Drive Configuration for 3.5-inch Drive Model

4.3.1 Up to 12 x 3.5-inch Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/10, 512 MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**3.5-inch HDD Cage** 12 x 3.5-inch hot plug drive bays	(Standard)
Drive 12 slots available	**SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.3.2 Up to 12 x 3.5-inch Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**3.5-inch HDD Cage** 12 x 3.5-inch hot plug drive bays	(Standard)
Drive 12 slots available	**SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.3.3 Up to 12 x 3.5-inch Drives with RAID 5/6 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	**3.5-inch HDD Cage** 12 x 3.5-inch hot plug drive bays	(Standard)
Drive **SATA HDD** 12 slots available	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.3.4 3.5-inch and 2.5-inch Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/10, 512 MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**3.5-inch HDD Cage** 12 x 3.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch HDD Cage** 2 x 2.5-inch hot plug drive bays Including 2x Single SATA to 2x Single SATA cable	N8154-47
3.5-inch Drive 12 slots available	**SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
2.5-inch Drive 2 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.3.5 3.5-inch and 2.5-inch Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**3.5-inch HDD Cage** 12 x 3.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch HDD Cage** 2 x 2.5-inch hot plug drive bays Including 2x Single SATA to 2x Single SATA cable	N8154-47
3.5-inch Drive 12 slots available	**SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
2.5-inch Drive 2 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

4.3.6 3.5-inch and 2.5-inch Drives with RAID 5/6 Controller with 1 GB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i **NOTE:** - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**3.5-inch HDD Cage** 12 x 3.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch HDD Cage** 2 x 2.5-inch hot plug drive bays Including 2x Single SATA to 2x Single SATA cable	N8154-47
3.5-inch Drive 12 slots available	**SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
2.5-inch Drive 2 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB 15K Hot Plug 2.5-inch SAS HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
		300GB 10K Hot Plug 2.5-inch SATA HDD 1x 300GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-390
		600GB 10K Hot Plug 2.5-inch SATA HDD 1x 600GB SATA HDD, 2.5-inch, 3Gb/s, 10,000 rpm	N8150-391

Category		Product Name / Description	Part Number
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1 x 100 GB SAS SSD, 2.-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
	SATA SSD	**100GB Hot Plug 2.5-inch SSD** 1 x 100 GB SATA SSD, 2.5-inch, 3Gb/s	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Up to two kinds of drives can be mixed in a HDD cage.

5 Optical Drive

Category	Product Name / Description	Part Number
External	**External DVD-ROM drive** Slim DVD-ROM drive, Bus powered, 0.8 A required	N8160-85

NOTE:

- Up to 1 optical drive can be connected.

6 Internal Tape Drives

6.1 Tape Drive Selection

Refer to the section in accordance with your type of tape drives:

- DAT: Refer to 6.2.1

NOTE:

- Tape devices cannot be directly connected to VMware systems. For VMware systems, it is recommended to connect and configure an additional backup server via network.

6.2 Tape / RDX Configuration

6.2.1 DAT

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port	(Standard)
Cable	**Internal USB cable** 1 x Internal USB to 1 x USB device	(Standard)
Drive **1 bay available**	**Internal DAT (USB)** DDS3 / DDS4 / DAT72, Native capacity 36 GB **NOTE**: DDS1 / DDS2 format are not supported	N8151-69
	Internal DAT (USB) DDS4 / DAT72 / DAT160, Native capacity 80 GB **NOTE**: DDS1 / DDS2 / DDS3 format are not supported	N8151-78

7 PCI Card

Please refer to **Supporting PCI Cards and Installable Slots** with regard to the position of PCI slot which can mount PCI card supported.

7.1 LAN Controller

Category		Product Name / Description	Part Number
Adapter	**GbE**	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1, FP / FH	N8104-138
		Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1, FP / FH	N8104-132
		Quad Port 1000BASE-T Adapter Broadcom ® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4, FP / FH **NOTE:** - Network cables with RJ-45 plug covers cannot be used. - Jumbo frames are not supported.	N8104-133
	10GbE	**10GBASE Adapter (SFP+/2ch)** Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8, LP / FH **NOTE**: - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - Up to 1 adapter is supported when RHEL6 is installed. - Supports up to 2 adapters covering 10Gb Converged Network Adapter and 10Gb Network Adapter.	N8104-128
		Dual Port 10Gb Converged Network Adapter BROCADE 1020 Dual Port 10Gbps Converged Network Adapter PCIe 2.0 x8, LP / FH, 2 x SFP modules, Max. one adapter **NOTE**: - Supports up to two adapters of10Gb Converged Network Adapter and 10Gb Network Adapter.	N8104-131
SPF+ Module		**SFP+ Module (10G-SR)** 1 x SFP+ Module for N8104-128	N8104-129

Teaming feature - Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows supports BASP (Broadcom Advanced Server Program) teaming while Linux supports teaming with bonding function supported by OS.

Network Interface	Team	OS
GbE LAN controller Standard network and N8104-135/-138/-132/-133	Up to four teams per one system Up to four ports per one team	Windows Server Red Hat Linux
10GbE LAN controller N8104-128	Up to two teams per one system Up to two ports per one team	Windows Server 2008/2008R2

NOTE:

- Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for teaming must be the same.
- 10GbE LAN teaming must be processed in a single LAN controller.
- When 10GbE and 1GbE LAN teams are mixed, the teams must be up to four per one system.

7.2 External Storage Controller

7.2.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	**RAID Controller (512MB, RAID0/1/5/6)** LSI MegaRAID SAS 9285-8e RAID0/1/5/6/10/50/60, 1GB, Ext. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s, LP / FH, Max. two adapters	N8103-160
RAID BBU	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9285-8e	N8103-162

NOTE:

- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

7.2.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	**Fibre Channel Controller (1ch)** Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8, LP / FH	N8190-153
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8, LP / FH	N8190-154
SAS	**SAS Controller** LSI SAS3442E-R Host Bus Adapter 3Gb/s SAS, Int. 4 / Ext. 4, SFF-8484 / SFF8470, PCIe x8, LP/FH, Max. three adapters	N8103-104A
	SAS Controller LSI SAS9212-4i4 Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8, LP/FH, Max. three adapters	N8103-142

7.3 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

8 Other Add-in Components

8.1 Redundant Power Supply Module

Product Name / Description	Part Number
450W Hot Plug Power Supply 1 x 450 Watt 80 PLUS® Platinum Power Supply	N8181-86F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum Power Supply	N8181-87F

NOTE:

- The power units must be the same to configure redundancy.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at:
  http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls

8.2 Redundant Fan Kit

Product Name / Description	Part Number
Redundant Fan Kit 5 hot plug redundant cooling fans for R120d-2E	N8181-99

8.3 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 1.2 module	N8115-11

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this kit.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

8.4 Internal Flash Memory

Available socket: 1

Product Name / Description	Part Number
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDR DVD without DVD media **NOTE:** Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory. The following operations can be performed with the flash memory: - Installation of Windows server with express setup - Installation of Starter Pack—the package of NEC qualified drivers and system setting tools - Installation of NEC ESMPRO Agent and Universal RAID Utility - Performance of the Test and Diagnosis Tool	N8115-10

8.5 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Product Name / Description	Part Number
Flash FDD USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-86

NOTE:

- Up to one drive can be connected.

8.6 Front Bezel

Product Name / Description	Part Number
Front Bezel Front bezel for R120d-2E Storage-Rich	N8146-31F

9 Add-on Components

9.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
Drawer w/ KVM	**Drawer**	**17-inch LCD Console Drawer (8port)** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-77F
	Cable	**Switch Unit Connection Cable Set (USB, 1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
Drawer w/o KVM	**Drawer**	**17inch LCD Console Unit 1U** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2m	N8143-76F

9.2 KVM Switch

Category	Product Name / Description	Part Number
KVM Switch	**Server Switch Unit (8 server)** 1U USB 8 port KVM switch	N8191-12F
Cable	**Switch Unit Connection Cable Set (USB,1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
	Switch Unit Connection Cable Set (USB,3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
	Switch Unit Connection Cable Set (USB,3m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)

9.1 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm 2U Kit For 2U Rack server	N8143-78

NOTE:

- The Cable Management Arm cannot be attached when the back parts of the slide-rail are removed.

9.2 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to **Server Management** for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: - Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives. **NOTE:** Remote KVM and remote media features are not available for virtual machines.	N8115-04

9.3 Medium and Cartridge

Category	Product Name	Drive supported	Part Number
DAT	DAT72(36GB) Medium 5 pack	N8151-69 N8151-78	N8152-08
	DAT160(80GB) Medium 5 pack	N8151-78	N8152-14
	DAT160 WORM (80GB) Medium	N8151-78	N8152-21
RDX	RDX Cartridge (320GB)	N8151-86	N8152-26
	RDX Cartridge (500GB)	N8151-86	N8152-27
	RDX Cartridge (1TB)	N8151-86	N8152-33

References

Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/voltage/power/ fan /degeneration (memory/hard drive)	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	BIOS/POST stall, Booting, OS stall, shutdown	✓	✓
Alerting	HW error, Boot error , and OS panic (by SNMP, E-Mail)	✓	✓
Remote KVM (via LAN)	POST/BIOS setup, ROM utility	✓[1]	✓
	Panic screen, Boot screen	✓[1]	✓
	CUI-based screen (OS console)	✓[1]	✓
	GUI-based screen (OS console)	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	Remote power capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓[2]	✓[2]
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
	Scheduling (without UPS)	✓[2]	✓[2]
Maintenance	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
Others	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
Industry standard	IPMI	2.0	2.0

[1] The optional serial port is not available for the feature.

[2] The feature is not supported on VMware ESX systems.

OS Support Matrix for PCI Cards

Part number	Product Name	WS 2008R2	WS 2008	WS 2008 x64	WS 2003R2	WS 2003R2 x64	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	ESX 4.1	ESXi 5.0
N8103-149	RAID Controller (512 MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-150	RAID Controller (512 MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-151	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-160	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-104A	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓
N8190-153	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-154	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-138	1000BASE-T adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓
N8104-131	Dual Port 10Gb Converged Network Adapter	✓	✓	✓	-	-	✓	✓	✓	✓	-	-

Supporting PCI Cards and Installable Slots

Part Number	Product Name	Slots						Note
	Slot # :	#1A	#1B	#2B	#3B	#1C	#2C	
	PCI Slot:	X8	x4	x4	X8	X1	X4	
	Card height:	-	LP	LP	FH	LP	LP	
	Slot type:	x8	x8	x8	x8	x4	x8	
	Installable card length (mm) :	-	197	197	177	177	177	
N8103-149	RAID Controller (512 MB, RAID 0/1) [PCIe 2.0 x8]	✓	-	-	-	-	-	
N8103-150	RAID Controller (512 MB, RAID 0/1/5/6) [PCIe 2.0 x8]	✓	-	-	-	-	-	
N8103-151	RAID Controller (1 GB,RAID 0/1/5/6) [PCIe 2.0 x8]	✓	-	-	-	-	-	
N8103-160	RAID Controller (1 GB,RAID 0/1/5/6) [PCIe 2.0 x8]	-	✓	✓	✓	-	✓	**Max. 2**
N8103-104A	SAS Controller [PCIe x8]	-	✓	✓	✓	-	✓	**Max. 3**
N8103-142	SAS Controller [PCIe 2.0 x8]	-	✓	✓	✓	-	✓	**Max. 3**
N8190-153	Fibre Channel Controller [PCIe 2.0 x8]	-	✓	✓	✓	-	✓	
N8190-154	Fibre Channel Controller (2ch) [PCIe 2.0 x8]	-	✓	✓	✓	-	✓	
N8104-138	1000BASE-T adapter [PCIe 2.0 x1]	-	✓	✓	✓	✓	✓	
N8104-132	Dual Port 1000BASE-T Adapter [PCIe 2.0 x1]	-	✓	✓	✓	✓	✓	
N8104-133	Quad Port 1000BASE-T Adapter [PCIe 2.0 x4]	-	✓	✓	✓	-	✓	
N8104-128	10GBASE adapter (SFP+/2ch) [PCIe 2.0 x8]	-	✓	✓	✓	-	✓	**Max. 2**
N8104-131	Dual Port 10Gb Converged Network Adapter [PCIe 2.0 x8]	-	✓	✓	✓	-	✓	
N8117-01A	Serial Port Adapter	-	✓	✓	✓	✓	✓	

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

Revision History

Revision	Date	Description
1.0	May 18, 2012	Initial release